

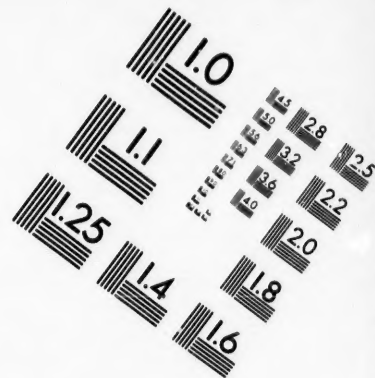
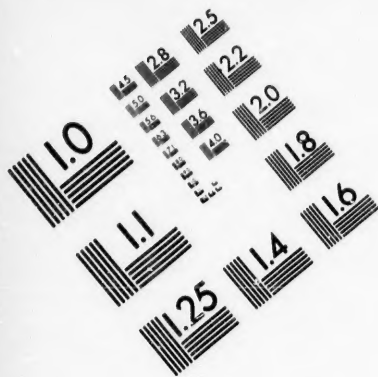
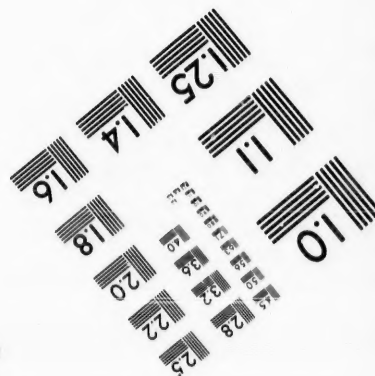
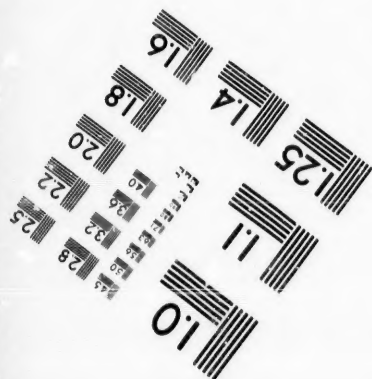
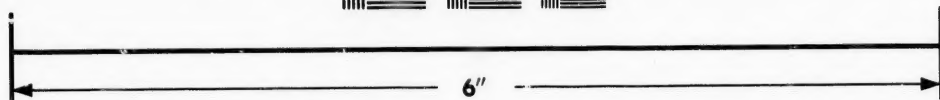
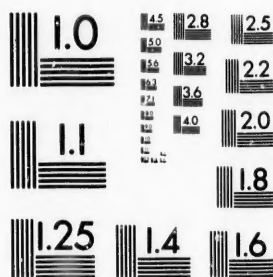


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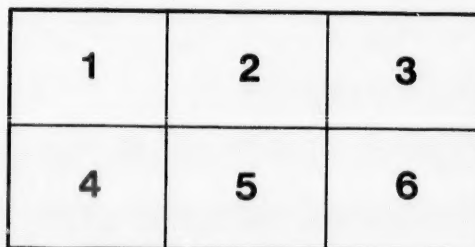
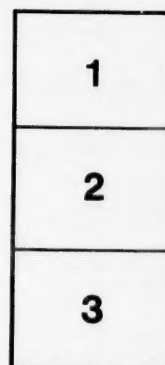
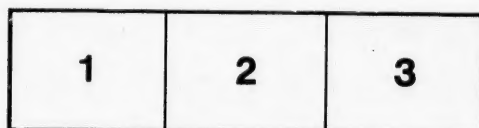
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HISTORY AND DESCRIPTION
OF THE JOE HOWE MINES

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THE JOE HOWE MINES,

SILVER LEAD.

WITH COPIES OF REPORTS, ASSAYS, ETC.

PROPERTY SITUATED AT SMITHFIELD,
COLCHESTER COUNTY, NOVA SCOTIA.

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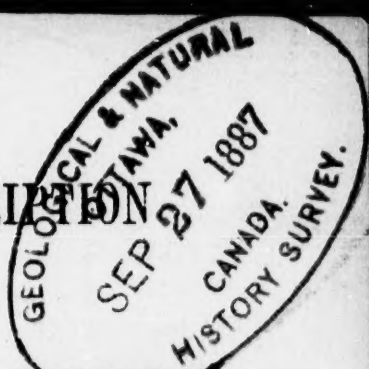
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THE JOURNAL OF THE
ROYAL ANTHROPOLOGICAL INSTITUTE

Volume 10, Part 1, 1900
Published by the Royal Society
London

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HISTORY AND DESCRIPTION OF THE JOE HOWE MINES.

DESCRIPTION.

The Joe Howe Mines are situated at Smithfield, in Colchester County, in the Province of Nova Scotia, fifteen miles from Truro, the County seat. Brookfield Station on the Intercolonial Railway, about 48 miles by rail from the city and harbor of Halifax, is the best point from which to reach the mines, the distance being thirteen miles by a good carriage road. The Stewiacke Valley and Lansdowne Railway will, when completed, run within two miles of the mines, and a connecting siding could be laid at small expense.

The property consists of 143 mining areas, (each area containing seven-eighths of an acre), and extends for upwards of two miles along the limestone formation which contains the ore, and is from 750 to 1000 feet in width. The mines extend east and west along the south slope of a valley, and are cut across by several small and rapid brooks, which empty into the stream flowing through the valley below. These brooks drain a lake on the level

above the mine, and could be made to yield good water power.

TITLE.

The title is perfect, being covered by leases for silver bearing ores, and also by a five mile right of search for lead, etc.

Considerable prospecting had been done on the property when it was visited by the Inspector of Mines in 1884, and below we print his report, only omitting his description of the location of the mine.

REPORT OF EDWIN GILPIN, JR., A. M., F. G. S.

Deputy Commissioner and Inspector of Mines for the Province of Nova Scotia. (Member of the North of England Institute of Mining Engineers, &c.)

HALIFAX, July 5th, 1884.

DEAR SIR,

I beg leave to hand you the following report on the Smithfield mine. The property contains 143 areas, each 250 by 150 feet, and extends, as laid out by the Government Surveyor, 6000 feet along the general course of the measures, viz., N. 75° W.

The measures holding the vein belong to the Mountain Limestone series of the carboniferous period, and are the equivalents of the same series as found in England and elsewhere.

The work hitherto performed has been almost entirely

confined to that part of the property which lies east of Henry Smith's house. Here a small prospecting shaft was sunk beside the road, and the ore exposed. The second shaft was sunk about 100 feet east of the road. This shaft was 35 feet deep, and a cross-cut driven through the ore body from the foot wall. The shaft showed ore, which was also found for 30 feet in the cross-cut. The ore is made up of carbonate of lime, carrying galena, with iron pyrites. The third shaft was sunk 450 feet from the road, and is about 55 feet deep. In it the ore was of similar quality to that met in the second shaft, but of better quality, the lead being more concentrated. The fourth shaft was sunk to the top of the ore, I am informed, but it was not open at the time of my visit.

The second and the third shafts are timbered, and could be used for raising ore, etc.

At Samuel Pike's house, 1950 feet west of the first shaft referred to above, were found the first indications of ore, which led to the prospecting which disclosed the deposit described above. About 1500 feet further west a prospecting trench showed float ore, and galena was observed in small quantities in a limestone band. I mention these discoveries, as they apparently indicate that the ore-bearing band extends through the greater part of the property.

The area is, undoubtedly, a very promising one, and the small amount of work hitherto performed has shown a good value. The ground already proved to carry ore

extends over 450 feet in length, the width of the ore ground may be estimated at 30 feet, the tunnel carrying ore at the face when discontinued.

I find on looking over the notes of my first visit to the mine that I estimated the proportion of No. 1 galena ore that could be hand dressed out of the ore at 16 per cent., and do not see any reason to change this estimate. This would give in the ground already opened about 25,000 tons of galena. This would be readily extracted at a very cheap rate by an open cut, permitting the use of steam for power drills, and of a whip for raising the ore, in fact quarrying.

During this extraction, work could go on, preparatory to mining operations in the lower part of the mine.

The district is favorably situated for carrying on mining operations, as there is abundance of timber in the vicinity, good roads, and water power within a few yards of the mine, &c., &c., &c. And the district for miles to the north of the mine is heavily timbered.

These notes will convey all the information I have about the property, and you are in possession of the assays and analyses that have been made of the ore at various times. I have always had a high opinion of the property, and consider it well worth opening up, and am pleased to learn that arrangements are proposed to that end, as it promises to prove the inauguration of an important addition to our mining industries.

I remain, yours very truly,

EDWIN GILPIN.

SUPPLEMENTAL REPORT.

HALIFAX, August 7, 1884.

DEAR SIR,

With respect to my memo. on the Smithfield Lead Mine, addressed to you under date July 5th, 1884, and to your query as to the correctness of the statement in it as to there being 25,000 tons of available galena, I beg leave to remark: My estimate is based on my examination of the dumps at the time of my first visit, by comparing the ore raised with the excavation made, and the examination of its freedom from stone, etc.

I calculated that from the deposit as it stood in the ground 16 per cent. of ore could be dressed out. Calculating the length of ground at 450 feet, the depth at 50 feet, and the width at 20 feet, I estimated the amount of ore as equivalent to a vein 450x50x5 feet or 112,500 cubic feet, and that 4-5 feet made a ton, or 25,000 tons of galena.

It may be considered that the grade of the ore, as calculated above, is placed at too high a rate; it was reckoned on ore practically free from pyrites, etc. Taking, however, one-fifth from the above amount, I feel that the figures of 20,000 tons would be under the mark, so far as I would form an opinion.

I remain, yours truly

E. GILPIN.

Mr. Douglass Browne, a miner of considerable experience in Mexico and the West, visited the mines at about the same time as Mr. Gilpin, and below will be found extracts from his report.

REPORT OF DOUGLASS BROWNE.

* * * In consequence * * and the favorable opinion expressed by those who had seen the property, I was induced to visit it, and was much impressed by the indications of a large and valuable deposit of lead and silver ore.

A sum of from \$8,000 to \$10,000 has been spent in prospecting and opening up the property, and to-day it gives promise in my opinion of becoming one of the largest lead producing mines in the world.

Having had 16 years experience in practical mining in several of the most important mining centres, I feel justified in forming and stating my opinion, and more especially as the same views have been expressed by several competent mining experts, who have examined these mines, &c., &c., &c.

DEVELOPMENT.

Besides the surface prospecting, four shafts have been sunk, varying in depth from 35 to 60 feet. These shafts have proved the ore body to extend 600 feet in length. A cross cut in one of the shafts has been run 35 feet, all in the ore body, and no wall yet reached; the vein is a brackish one, and, in every instance as the shafts were sunk, the ore was found to be increasing in purity and quality. The last

15 feet of the deepest shaft, a shaft 5 ft. x 10 ft., gave 30 tons of ore.

The ore occurs in the vein in solid lumps of galena, varying in weight from a few pounds up to several tons. Taking the surface and as far as yet opened, solid galena constitutes at least one-tenth of the whole vein, &c., &c., &c. And, in order to extend the development further, the necessary capital is required to erect smelting and reduction works, which the present showing amply warrants; the indications being that 50 feet more in depth sunk on the shafts would show a solid vein of galena with all the lime and other vein matter eliminated.

The assays made show the ore to contain 50 per cent. of lead, and besides to yield from \$3 to \$100 of silver, and from a trace up to 6 dwts. of gold per ton of 2000 lbs.

PROSPECTUS.

The trade and navigation tables of the Dominion of Canada for the year ending June 30th, 1883, show that over \$20,000 in duties was paid on scrap and pig lead, imported during the year. The total duty paid on lead and its manufactures being upwards of \$32,000, as follows, viz. :

Old scrap and pig imported,	\$48,780	cost.	Duty,	\$19,523.79
Bars, blocks & sheets "	28,785	"	"	5,156.46
Shot "	10,655	"	"	3,285.95
Other articles		"	"	4,306.15
				\$32,272.35

For practical calculation, it may be said that the duty on importing lead into the Dominion of Canada is \$8.00 per ton. And, as yet, no lead mine being operated in the Province of Nova Scotia, we have the benefit of this duty.

The wholesale market value of lead in Halifax, Nova Scotia, is \$90 per ton. In New York City it is from \$60 to \$70 per ton.

A glance at the map will show that the production of lead once established at or near Halifax, would enable the owners to outrival all other Canadian and American competitors, who are further west, in supplying the European and local markets, and as the great lead mines of America are chiefly in the far West, the greatly increased cost of labor, material and transportation there, over a mine situated in Nova Scotia, will enable the owners of this mine to defy competition from them even in the chief Canadian and American cities.

In Nova Scotia material of all kinds necessary to prosecute mining is very cheap, and labor is low. The daily wages of the best miners are from \$1.25 to \$1.40 per day. Fuel, such as coal, coke and wood, also all lumber required for mining purposes, is plentiful and moderate in price.

I add a statement of what might be expected as profit, from the erection of a smelter with a capacity of 30 tons of ore per day, which, with silver and gold extracting plant, could be put up at a cost of \$25,000, namely :

Cost of mining and delivery 30 tons of ore at the smelter, including superintendence and dead work, &c	\$240.00
Smelting \$10,000 per ton,	300.00
Freight on bullion	75.00
	\$615.00

PROCEEDS.

15 tons lead bullion worth in Halifax \$90 per ton	\$1350
Silver per ton of bullion at 30.00	\$450
	1800.00
Nett profit per day	\$1185.00

Your obedient servant,

DOUGLASS L. BROWNE.

WORKS CONDUCTED UNDER THE MANAGEMENT OF DOUGLASS BROWNE.

Mr. Browne, in conjunction with two other gentlemen, secured a year's bond of the property, and they could have sold out at a high figure to an English Company, but concluded to put up a smelter and work the property. A gentleman in Halifax agreed to raise the capital necessary to erect a small smelting works, and a metallurgist from Swansea happening to be in Halifax, he contracted to put

up works that would successfully treat the ore. A few thousand dollars, an entirely insufficient sum, were raised, and a small smelting plant hurriedly erected, the promoters of the enterprise expecting to pay for the further development of the mine by the sale of the product from the smelter. They were doomed to disappointment, as the smelting works proved an entire failure. In this dilemma Prof. Richards, of the Institute of Technology in Boston, was appealed to, and, on his recommendation, Mr. Walter J. Koehler, a thorough metallurgist, was employed to investigate matters. He found that some five thousand dollars were required to complete the works, and that the ore was easily smelted, but, as the promoters had exhausted their capital, the works were shut down, and, owing to some slight entanglements, (which have only now been cleared up), nothing has since been done on this valuable property.

REPORT OF WALTER J. KOEHLER, S. B.,
METALLURGIST.

MIDDLE STEWIACKE, Feby. 4th, 1885.

DEAR SIR,

At your request I came here three weeks ago to examine the smelting works connected with the Smithfield Lead Mines, and to report upon the proper method of treating the ore.

From the analyses I made, the following is the average composition of the ore as delivered from the mine to the smelter:—

Insoluble residue. 2.6 per cent.

Sulphide of Iron..	25.5	"	containing..	11.9%	Iron.
" Zinc..	13.5	"	"	9.0	Zinc.
" Lead..	42.8	"	"	37.2	Lead.
Carbonate of Lime	9.6	"	"	5.4	Lime.
" Manganese	2.7	"	"	1.4	Manganese.

Total.....96.7

The composition of the ore presents nothing to hinder its successful and profitable treatment. The proper method of treatment would be as follows:

- 1st. Roasting in a reverberatory furnace.
- 2nd. Smelting the roasted product in a blast furnace.
- 3rd. Softening the resulting lead in a reverberatory furnace, or possibly in a pot.

The approximate cost of these operations would be as follows:

1st. Crushing preparatory to roasting per ton.....	\$.60
Roasting.....	1.60
2nd. Smelting, with present furnace.....	3.50

\$5.70

Allowing that 12% of the lead in the ore were lost during the melting, which, however, would be reduced by proper condensing arrangements to 7 or 8%, 3 tons of ore

would produce one ton of lead, which would bring the cost per ton of unrefined lead to \$17.10.

3rd. Refining per ton of lead \$2.00

These items would bring the cost of refined lead per ton to \$19.00.

These estimates are all made on a very high basis, and there is little doubt that after a short time the cost would be shown to be materially lessened.

The ore is decidedly an easy one to treat, it is self fluxing, (provided it has undergone a thorough roasting), so that the largest part of the cost would be due to labor and fuel.

The present smelter consists of a small shaft furnace, 2 ft. square at the tuyers, 6 ft. high from tuyers to feed door, an 8 horse-power engine with boiler, and a number 6 Sturtevant fan. This furnace cannot treat more than 5 or 6 tons of ore per day, and it is on this basis that the above figures are founded.

With a larger plant, say a 20 ton furnace, the item of smelting would be lessened at least 40 per cent., longer &c., &c., could be made, incidental expenses would be lessened, and, as a consequence, the resulting profit would be greater.

In conclusion, I would reiterate that I cannot see why a smelting works run in connection with the Smithfield Lead Mines should not prove a highly profitable enterprise.

I am, sir, &c., &c., &c.,

WALTER J. KOEHLER, S. B.,
Metallurgist.

LETTER FROM MR. WALTER J. KOEHLER.

BOSTON, Feb. 10th, 1885.

DEAR SIR,

Since my arrival home, I have carefully worked over the problem presented by the Smithfield ores, and have come to the following conclusion:—On the basis of ore carrying 40 per cent lead, (and Mr. Brown says he can easily sort it as high as that), the expenses for producing a ton of lead are as follows:—

By roasting the ore in Kilns.....	\$10.66
“ “ Reverberatories.....	13.31

These figures simply include the labor, fuel and fluxes used directly in the process of roasting and smelting, and do not include engineer, blacksmith, steam, wear and tear, superintendence, &c., &c. My object was to see whether it was cheaper to roast the ores in reverberatories or kilns per ton of unrefined lead. These figures show conclusively a balance of \$2.65 per ton in favor of kilns.

Hence, I undoubtedly advise the erection of kilns. This can be done much cheaper than building reverberatories, and hence, more money can be expended upon a good blast furnace, which, after all, is the most important factor, &c., &c. I have worked the subject carefully with pen in hand, and I am very positive in what I state.

Yours, &c.,

WALTER J. KOEHLER.

The ore furnished the smelter was all from No. 3 shaft, and, as will be seen by Mr. Koehler's assay, contained no silver. Assays of the ore, which we append, show that some of the ore contains silver in paying quantities, but this ore was mainly from No. 2 shaft.

ESTIMATE OF THE VALUE OF THE ORE NOW DEVELOPED ON A LEAD BASIS ONLY.

Mr. Browne's estimate of the cost of mining and delivering ore at smelter, including superintendence and dead work, etc., etc., equals \$8 per ton, (a very high average).

Mr Koehler estimates that 3 tons of ore will produce one ton of unrefined lead.

The cost of producing one ton of 2000 lbs. of refined lead will therefore be as follows :

Cost of mining and delivering 3 tons of ore at smelter		\$24.00
Cost of roasting same in kilns and smelting as per Mr. Koehler's estimate	\$10.66	
Refining	2.00	12.66
Total cost of mining and smelting 1 ton refined lead		\$36.66
Freight on same to Halifax		5.00

Total cost of mining, smelting and delivering one ton refined lead at Halifax.....	\$41.66
Wholesale price of lead at Halifax, Sept. 6th, 1887, \$65, say.....	60.00
Net profit on each ton refined lead....	<u>\$18.34</u>
	18.00

To be certain of not over-estimating call this
According to Mr. Gilpin, at least 20,000 tons
of ore have been developed, which at 3
tons of ore per ton of lead, should yield
over 6666 tons of refined lead, giving a
net profit of \$18 per ton or.....

\$119,988.00

There are no lead mines being worked in the Dominion,
and as the Trade and Navigation tables prove that 2000
tons of scrap and pig lead are annually imported, works
turning out 30 tons per week would not be able to supply
the home market. In fact, one of the most reliable houses
in the Dominion of Canada, doing business at Halifax,
would purchase the entire output of the smelter at the rate
of \$60 per ton, delivered in Halifax at present market value.

In addition to scrap and pig lead, there was imported in
1886 9,405 cwt. sheet and bar lead, 503,117 lbs. shot, and
92,352 lbs. acetate and nitrate of lead.

The duties on lead and its manufactures are as follows :

Old scrap and pig, forty cents per one hundred pounds.
Bars, blocks and sheets, sixty cents “ “
Lead pipe and lead shot, one and one-quarter cents per lb.

All other manufactures of lead not specified, 30 per cent *ad valorem*.

We will not touch upon the possibilities of erecting manufactories for bar and block lead, lead pipe, shot and white lead, for all of which there is a profitable field, but conclude with the statement that the preliminary difficulties have now been overcome, and that there is nothing to prevent the Joe Howe Mines being worked at a large profit.

It is known that a large body of ore has been developed ; that this body has never been tested as to depth ; and that, although rich indications of ore have been found all through the property, upwards of two miles in extent, only one thousand feet have been prospected. Of still greater importance is the fact that the correct treatment of the ore has been determined, and that it is almost self-fluxing.

The number of owners in the property has made it somewhat difficult to handle in the past, but we have now been given full control, and are prepared to negotiate its sale or arrange with practical men and capitalists to erect smelting works.

We desire, if possible, to interest you in the mines, and, if you should feel inclined to investigate, we should be pleased to furnish all information in our power and give you every facility for examining the property.

Address either C. F. Fraser or Howard Clark, care of the Halifax "Critic," 161 Hollis Street, Halifax, N. S.

COPIES OF SOME ANALYSES.

SIR,—I have made an assay of the Smithfield ore, which gave the following results per ton, viz. :

Gold, 17 dwt., \$16 50.

Silver, 6 oz., \$6.00.

Lead, 20 per cent.

W. A. MERRALL,

Assayer.

ACADIA POWDER WORKS, Halifax, N. S.,

June 13th, 1881.

DEAR SIR,—I have had an analysis of the ore sent me, etc. It assays :

39 per cent. lead.

14 " sulphur.

10 " iron.

10 " manganese.

\$60 silver.

5 per cent. lime.

Please let me know what you know about it.

I am, yours truly,

B. C. WILSON.

ACADIA POWDER WORKS, Waverly, N. S.,

28th June, 1881.

DEAR SIR,—I got your letter of 27th and samples of ore. This sample of ore is amply good for \$100 a ton ; of

course it is a picked price, but the average ought to be good enough. The associated rock, of which you send a sample, indicates that it too might be worth something, etc., etc.

I am, yours truly,

B. C. WILSON.

By Ledoux and Rickets, Engineers, Chemists and Assayers, New York.

Sample of Ga'ena ore weighing 225 lbs. after crushing, grinding and sampling.

Lead (by wet analysis)..... 40 per cent.

Lead (obtained by smelting). 38.84 “

Gold, none.

Silver, trace.

By Stillwell & Gladding, Analytical and Consulting Chemists, New York.

Gold, }
Silver, } trace.

Lead, 78 per cent.

Manganese 0.18 “

By Ike H. Hildebrand, Assayer, Georgetown, Colorado.

Sample Nova Scotia ore :

Silver, 13 oz. ; Lead, 70 per cent., value, \$49.82.

By Edwin Gilpin, Jr., A. M., &c.

1st.—Big boulder sample :

Lead, 1170 lbs. to the ton of ore.

Silver, 9 oz. " " lead.

Gold, 5 dwt. " " "

2nd.—Other ore :

Lead, 975 lbs. to the ton of ore.

Silver, 10 oz. " " lead.

Gold, trace.

3rd.—Sample pure Galena :

Lead, about 1600 lbs. to the ton of ore.

Silver, 34 oz. to the ton of lead.

Gold, not found.

4th.—The specimen of galena contained 75 per cent. lead, and 20 ounces of silver to the ton of lead

I should remark that the silver in your ore appeared to be present as fine crystals of brittle silver ore, from examination under a strong magnifying glass.

This would account for the varying percentages of silver I have found in your ore in small samples.

I remain, yours truly,

EDWIN GILPIN.

By the late Theodore Hale, Assayer, formerly of Halifax.

Sample close grained Galena ore :

Showing 74 per cent lead, Com. value per ton,	
2000 lbs.....	\$ 29.60
144 oz. silver @ 1.01 per oz	145.44
Gold, none.....	
Commr. value.....	<u>\$175.04</u>

About one hundred pounds of ore shipped to England by Charles Scott, C.E., returned 50 per cent. lead and 6 oz silver.

\$ 29.60

145.44

\$175.04

England
nd 6 oz

